PATENT COOPERATION TREATY

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INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB2005/050219	30.11.2005	23.12.2004

International Patent Classification (IPC) or both national classification and IPC
INV. G06F17/16 G09G3/32

Applicant
CAMBRIDGE DISPLAY TECHNOLOGY LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office - Gitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	see form PCT/ISA/210	DOMINGO VECCHIONI, M Telephone No. +49 30 25901-666

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2005/050219

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. ☒ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material:

      ☐ on paper

      ☐ in electronic form

   c. time of filing/furnishing:

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in electronic form.

      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2005/050219

Box No. II Priority

1. ☐ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

see separate sheet

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-51
	No:	Claims	
Inventive step (IS)	Yes:	Claims	18,36-48
	No:	Claims	1-17,19-35,49-51
Industrial applicability (IA)	Yes:	Claims	1-17
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43*bis*.1 and 70.10)

and / or

2. Non-written disclosures (Rules 43*bis*.1 and 70.9)

see form 210

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item II

Priority

1. The international filing date of the present application is 30.11.2005. The present application claims the right of priority of the following earlier application:

   P1: GB0428191.1 filed on 23.12.2004.

   The claim to priority of P1 is valid for present claims 1 to 51 as the P1 includes identical claims.

   It is however noted that the present application contains subject-matter in the desciption (at pages 3 to 6 in relation to applications of non-negative matrix factorization other that to driving displays and from page 38, last paragraph to page 41, first complete paragraph) which is not disclosed in P1. Inclusion of this subject-matter in the claims at further stages of the procedure may lead to loosing the priority of P1 for these claims.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

2. Reference is made to the following documents cited in the International Search Report:

   D1: LIU W ET AL: "Existing and new algorithms for non-negative matrix factorization" FINAL REPORT CS 383C PROJECT, DEPARTEMENT OF COMPUTER SCIENCE, UNIVERSITY OF TEXAS, AUSTION, USA, [Online] 26 August 2004 (2004-08-26), XP002468343 Retrieved from the Internet: URL:http://web.archive.org/web/20040826233249/www.cs.utexas.edu/users/liuwg/383CProject/final_report.pdf> [retrieved on 2008-02-06] cited in the application

   D2: EP-A-0 621 578 (MATSUSHITA ELECTRIC IND CO LTD [JP]) 26 October 1994

(1994-10-26)

D3: WO 2004/001707 A (KONINKL PHILIPS ELECTRONICS NV [NL]; TRAGS ALEXANDER J R [NL]) 31 December 2003 (2003-12-31)

D4: WO 94/27276 A (MOTOROLA INC [US]) 24 November 1994 (1994-11-24)

D5: WO 2006/035248 A (CAMBRIDGE DISPLAY TECH [GB]; SMITH EUAN CHRISTOPHER [GB]; LAWRENCE NIC) 6 April 2006 (2006-04-06)

Claims 1 to 17

3. Independent claim 1 is directed to "a method of digitally processing data in a data array defining a target matrix (X) using a non-negative matrix factorization to determine a pair of matrices (F, G)". The terms "target matrix", "features" and "weights" used in claim 1 refer to purely abstract mathematical notions. The steps of the claimed method are steps of a mathematical algorithm for solving a purely mathematical problem, the factorization of a given matrix in a product of non-negative matrices.

It is questionable whether the expression "digitally processing data" implies the use of technical means. If not, the claimed method is a mathematical method as such for which no opinion on novelty and inventive step needs to be given (Rule 67.1(i) PCT).

In the following, it is assumed that the expression "digitally processing data" in independent claim 1 (and in dependent claims 2 to 17) implies the use of undefined technical means for carrying out the claimed method.

4. Interpreted in that way, the subject-matters of claims 1 to 17 do not involve an inventive step (Article 33(3) PCT).

4.1 *Independent claim 1*

The steps of the claimed method define a mathematical algorithm addressing a

purely mathematical aim. In the context of claim 1, they do not contribute to a technical solution to a technical problem and cannot, therefore, support the presence of an inventive step. The only technical aspect of the subject-matter of claim 1 is the use of undefined technical means for carrying out the mathematical algorithm. However, using technical means like a computer to carry out a mathematical algorithm is trivial. The subject-matter of claim 1 lacks thus an inventive step.

4.2 *Dependent claims 2-12, 14-16*

The additional features of dependent claims 2 to 12 and 14 to 16 relate exclusively to further details of the mathematical algorithm which can also not support the presence of an inventive step.

4.3 *Dependent claim 13*

Claim 13 specifies that the data comprises image data for an image in a time series of images. It is however not apparent from claim 13 which technical purpose is served by processing data relating to an image in the claimed manner. Claim 13 is not restricted to a concrete technical application as e.g. determining matrices for displaying video data as suggested in the description at page 9, last paragraph. For this reason, the only technical aspect of claim 13 remains the use of undefined technical means for carrying out an algorithm, which is trivial.

4.4 *Dependent claim 17*

The method of claim 17, interpreted in the light of page 26 of the description (see point 15.2 below), provides for a given image a collection of subframes which when combined approximate said image. It is not clear which technical effect is achieved such a decomposition taken in isolation. A reasoning similar to that provided at point 4.3 above appears therefore applicable to show a lack of inventive step of the subject-matter of dependent claim 17.

Claim 18

5. The subject-matter of claim 18, restricted as suggested at point 15.3 below and referring to claim 1 clarified as suggested at points 14.1, 14.2 and 15.1 below, appears to be new (Article 33(2) PCT) and to involve an inventive step (Article 33(3) PCT).

5.1 Claim 18 is directed to a method of driving a display which implements multi-line addressing (see point 15.3 below), which represents a sufficiently concrete technical application of the proposed non-negative matrix factorization algorithm. With the step "and driving said display ..." in claim 18, the mathematical algorithm is also functionally restricted to this application. In the context of claim 18, the mathematical algorithm involved may therefore support the presence of inventive step.

5.2 Document **D2** (see figure 2 and page 2, line 10 to page 3, line 5) discloses a method of driving a display which implements multi-line addressing in which two matrices, "Orthogonal Matrix" and "Converted Data" (see D2, figure 2), are used to drive the rows and columns of pixels of the display to form an image using a plurality of subframes. The first matrix, "Orthogonal Matrix", is orthogonal and predetermined. Its entries are binary digits "+1" or "-1", it may consists of Walsh functions (see D2: page 2, lines 30 to 38; page 3, lines 1 to 5). The second matrix, "Converted Data", is obtained from the image matrix (see D2, figure 2: "Image Data") by the equation (first matrix) x (image matrix) = (second matrix). It may also include positive and negative entries. Both matrices must be of same dimensions as the image matrix.

As the first matrix is orthogonal, its inverse equals (first matrix)^T. Hence, the method of D2 involves a factorization of the image matrix into a product (first matrix)^T x (second matrix). It follows that the transposed of the matrix "Orthogonal Matrix" and the matrix "Converted Data" in D2 may be put in correspondance with the "row matrix" and the "column matrix" of claim 18, respectively.

5.3 The method of claim 18 differs from the method of D2 in that the image matrix is subject to a non-negative matrix factorization according to the method of (clarified) claim 1 to determine the row and column matrices. The resulting row and column matrices have only non-negative entries and are both dependent on the image matrix. The mux rate may be selected so as to be smaller than the dimensions of the

image matrix, such that less row drive epochs may be required (see present application, page 8, last paragraph).

The method of claim 18 may thus be considered to solve the technical problem of *reducing the number row drive epochs required for displaying an image in the method of D2.*

5.4 Documents **D3** and **D4** (see passages cited in the search report) disclose essentially the same method as D2. While non-negative matrix factorization is known *per se*, its use in the context of multi-line addressing as specified in claim 18 to solve the above technical problem is neither disclosed nor suggested in the available prior art pursuant to Rule 33.1(a) PCT.

Claims 19-32

6. The subject-matters of claims 19 to 32 do not involve an inventive step (Article 33(3) PCT).

6.1 Claims 19 to 32 relate to applications of non-negative matrix factorization which are known per se (as acknowledged in the description: pages 3 to 6). Claims 19 to 32 refer to the method of claim 1 for the computation of the non-negative matrix factorization.

It is noted that while some of these applications may be considered technical (e.g. claim 19 relating to image matching), others are clearly not (e.g. claim 32 relating to abstract data analysis).

6.2 In any case, it would obvious for a skilled person to consider using the method of non-negative matrix factorization disclosed in **D1** as "NMF Algorithm 1" (see D1, section 2, point (2)) for these known applications. According to this method, matrices G and F of a non-negative matrix factorization $X \approx G \cdot F$ are determined in an iterative manner. In each iteration, a column of G and a corresponding row of F are processed. Updated values for said selected column and row are determined according to equation (1-3) in D1 which implements a non-negative constraint.

The equations (1-3) in D1 do not explicitely involve a target contribution as defined in claim 3. It is not apparent that any technical effect may be derived from involving such a target contribution in the calculations. In particular, no faster convergence can be derived from it. In fact, the equation (1-3) may be reformulated so as to involve a term equal to the "target contribution" (e.g. by adding and substracting it) without any modificiation to the convergence rate or the final results of the algorithm.

It follows that no inventive step can be acknowledged for the alternative in each of claims 19 to 32 which is directly dependent on claim 1.

7. It is noted that the present application suggests that a gain in processing speed due to a faster convergence with respect to convential algorithm is achieved by the proposed non-negative matrix factorization algorithm. This effect may, in the context of a concrete technical application, be considered a technical effect (improving the processing speed of a technical process).

However, features essential to achieve this effect are missing in claim 1. Crucial for improving the convergence rate is the short cutting of iterations by reducing the update computation for a single column of G or row of F to a non-negative least squares problem for which an optimal solution can then be estimated via an algebraic expression instead of having to perform a series of iteration: see page 35, last paragraph to page 36, first paragraph. See also page 30 and the paragraph bridging pages 28/29.

Claims 33-35

8. The subject-matters of claims 33 to 35 do not involve an inventive step (Article 33(3) PCT).

In one of their alternatives, claims 33 to 35 are directed implementations of the mathematical algorithm defined by the steps of the method of claim 1. The only technical aspects of these subject-matters are the implementation aspects. An implementation of this algorithm as control code stored either on a carrier medium (claim 33) or on a program memory included in a conventional computer system

(claim 34) or an implementation as an apparatus comprising means defined functionally in terms of the steps of the mathematical algorithm (claim 35) represent however clearly straightforward implementations.

Claims 36-46, 47, 48

9. The subject-matters of claims 36 to 48, restricted as suggested at point 15.4 below, appear to be new (Article 33(2) PCT) and to involve an inventive step (Article 33(3) PCT).

9.1 The method of claim 36, restricted as suggested at point 15.4 below, is new and inventive over D2 and the further prior art pursuant to Rule 33.1(a) PCT for essentially the same reasons as the method claim 18 (see point 5 above).

9.2 This applies similary to dependent claims 37 to 46 and corresponding claims 47 and 48.

Claim 49

10. The subject-matter of claim 49 does not involve an inventive step (Article 33(3) PCT).

As explained at point 6.2 above, **D1** dislcoses a method of factorizing a matrix into a first matrix and a second matrix involving iteratively adjusting a column of said first matrix and a corresponding row of said second matrix. It would be obvious to implement this method as an integrated circuit. The subject-matter of claim 49 is thus obvious.

Claims 50, 51

11. The subject-matter of claim 50 is clearly a mathematical method as such (Rule 67.1(i) PCT). the use of technical means being not even suggested.

If claim 50 was restricted to a computer-implemented method, it would be considered to lack of inventive step (Article 33(3) PCT) for reasons similar to those presented at

point 4.1 above with respect to claim 1.

12. The subject-matter of claim 51 lacks an inventive step (Article 33(3) PCT) for reasons similar to those presented at point 8 above with respect to claim 33.

Re Item VI
Certain documents cited

13. *Document D5 - Claims 36, 38-48*

D5 is an international patent application claiming the right of priority from UK patent application No. 0421712.1 filed on 30.09.2004 and referred to in the present application at page 2.

In accordance with Rule 64.3 and 70.10 PCT in conjunction with Rule 43*bis*.1(b) PCT, it is noted that D5 may be relevant for the determination of the novelty and inventive step by designated or elected Offices as an earlier filed but later published patent application because its claimed priority date, 30.11.2004, is prior to the claimed priority date of the present application, 23.12.2004 (see PCT International Search and Preliminary Examination Guidelines, edition of 11.03.2004, paragraph 11.08).

13.1 In this respect, it is noted that present independent claim 36 is very close to subject-matter disclosed in D5. D5 discloses the application of non-negative matrix factorization to driving a display implementing mult-line addressing (see in particular claim 14 of D5) but does not explicitly disclose details of the factorization algorithm to be used. The feature of present claim 36 of iteratively adjusting factor matrices each row of one matrix and each column of the other matrix in turn is not explicitely disclosed in D5. However, D5 refers to D1 as a reference providing techniques for computing a non-negative matrix factorization (NMF) and indicate that the content of D1 is "incorporated by reference" (see D5, paragraph bridging pages 23/24). D1 discloses an NMF algorithm which shows the missing feature: see D1, section 1, point 2 "NMF Algorithm 1".

The further features of present claims 38 to 48 appear to be also disclosed in D1: see claims 1 to 4 and 19 to 23 and page 38, first complete paragraph.

Hence, the novelty of the subject-matters of present claims 36 and 38 to 48 may be objected to on the basis of D5 depending on the extent to which the incorporation by reference of D1 in D5 is considered to contribute to the disclosure of D1 by designated or elected Offices.

13.2 Additionally, it is noted that the present application is also "incorporated by reference in its entirety" in D5, in particular relation to NMF techniques, but that reference in D5 does not benefit of the claimed priority of 30.11.2004 as it is not included in the priority document of D5. It will thus not be relevant for a novelty objection based on D5.

Re Item VIII
Certain observations on the international application

14. The requirements of Article 6 PCT are not met because claims 1 and 2 are not clear.

14.1 In independent claim 1, the wording *"a row of said one of said first and second matrices"* is not clear as not which of the two matrices is referred to by "said one".

This wording is read as "a row of one of said first and second matrices".

14.2 The expression *"target contribution of said selected row and column to said target matrix"* used in independent claim 1 is not clear as the term "target contribution" has no well-defined technical (or mathematical) meaning in the relevant field.

Including the additional feature of dependent claim 3 may resolve this clarity problem.

14.3 The expression *"determining a new value ... substantially independent of a previous value"* used in dependent claim 2 is vague and unclear. The explanations provided in the description at page 7, first complete paragraph, are also not susceptible to properly define the scope of protection of a claim.

The additional feature of dependent claim 4 appears to better express the kind of independence which is intended (see also the last complete paragraph at page 28).

15. The requirements of Article 6 PCT are not met because claims 1, 17, 18 and 36 are not supported by the description.

15.1 *Claim 1*

The wording of independent claim 1 allows that, for a non-negative factorization of a matrix X into a product G·F, the *"selected row and column"* used in the claimed method consists in an arbitrary row of G and an arbitrary column of F. This is however not supported by the description.

According to the paragraph bridging pages 25/26, the method operates at each iteration on a single column of G (G_{Ia}, with a denoting an index between 1 and A) and a single row of F, namely the row of F with same index as the column of G (F_{aU}). It is essential that (i) a column of G and a row of F are taken, and (ii) that their respective indices are equal.

As regards (ii), it is noted that a column of G and a row of F with different column resp. row indices make no joint contribution to the product G·F, such that "determining a target contribution of said selected row and column to said target matrix" as in claim 1 would be pointless.

As regards (i), selecting a row of G and a column of F would require a completly different approach as that described in the application. First, the residual $R_{IU}{}^{a}$ for the selected column-row pair (or "target contribution") would no longer be a matrix of same size as the target matrix, which can be interpreted as an IxU image subframe (see page 26), but a single value. Performing a least squares fit for the equation (4) at page 26 or equation (25) at page 35 would not make sense any more. In particular, if F_{aU} in equation (25) at page 35 is a column, multiplying with $F^{T}{}_{aU}$ as suggested would result in a term $F_{aU}\,F^{T}{}_{aU}$ which is a matrix, possibly not invertible, and not a single scalar value as in the case where F_{aU} is a row. It is not apparent how the simplification achieved in the latter case (see page 36, first sentence), responsible in

the end for a faster convergence of the algorithm (see paragraph bridging pages 28/29), could be realized in the former case. The application does not disclose how to proceed if a row of G and a column of F are taken and, in particular, how to achieve fast convergence in this case.

The general statement at page 3, first paragraph ("it is immaterial which matrix is labelled the first matrix and which the second matrix") can only be agreed insofar it means that it is immaterial which of G and F in the product G·F are considered to determine features ("first matrix") and which to determine weights ("second matrix").

It is however essential that the "selected row and column" used in the method of claim 1 consists of a column of G and a row of F, the column index of G and the row index of F being equal.

15.2 *Claim 17*

The wording of the preamble of independent claim 1 (read in the light of the second paragraph at page 1) suggests that the "set of features" corresponds to the set of columns of the "first matrix" and the "set of weights" corresponds to the set of rows of the "second matrix".

The additional feature of dependent claim 17 specifies that the data comprises image data defining an image and that the set of features comprises a set of subframes which when combined according to said weights approximated said image. This appears to mean that the data array represents an image and that each column of the first matrix represents a subframe.

This is however not consistent with the interpretation of the NMF factorization of an image matrix X as a decomposition into subframes which is provided in the description. According to page 26 (see the sentence following equation (4)), the NMF factorization of an IxU image matrix X into an IxA matrix G and an AxU matrix F defines a decomposition of the image into A subframes, each subframe corresponding to the product of a column of G (G_{ia}) with the row of F with same index (F_{aU}). These A subframes contributing to a complete IxU displayed images are

represented by A matrices of dimension IxU ($G_{ia} \cdot F_{aU}$, a=1, ..., A). See also page 21, second complete paragraph: "subframe of the displayed image the same size as the originally factorized matrix".

The subframes are thus not represented by single columns or rows of any of the matrices F and G, as suggested by the wording of claim 17.

15.3 *Claim 18*

It is clear from the whole description (e.g. page 2...) that the application to driving a display does not work for any display but for a *display which implements multi-line addressing* (see e.g. page 20 and page 22, last paragraph referring to figure 5a). Claims 16 and 36 should be restricted accordingly to be supported by the description.

15.4 *Claim 36*

While the whole application is concerned with *non-negative matrix factorization* and its applications, the method of claim 36 is not restricted to non-negative matrix factorization. There is no specific disclosure in the application of another type of matrix factorization for which the processing by column/row pair and its application in the context of driving an electro-optic display as specified in claim 36 would make sense.

It follows that claim 36 should be restricted to a non-negative matrix factorization to be supported by the description.

Also, the relationship between the factor matrices and driving the display is left unclear in claim 36. It appears that only a relationship as specified e.g. in claim 18 is supported by the description, such that claim 36 should be restricted accordingly.

16. It is noted that the objections of clarity and lack of support raised above apply equally to dependent and corresponding claims.

Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO-ISA)

General information	For all international applications filed on or after 01/01/2004 the competent ISA will establish an ISR. It is accompanied by the WO-ISA. Unlike the former written opinion of the IPEA (Rule 66.2 PCT), the WO-ISA is not meant to be responded to, but to be taken into consideration for further procedural steps. This document explains about the possibilities.
Amending claims under Art. 19 PCT	Within 2 months after the date of mailing of the ISR and the WO-ISA the applicant may file amended claims under Art. 19 PCT directly with the International Bureau of WIPO. The PCT reform of 2004 did not change this procedure. For further information please see Rule 46 PCT as well as form PCT/ISA/220 and the corresponding Notes to form PCT/ISA/220.
Filing a demand for international preliminary examination	In principle, the WO-ISA will be considered as the written opinion of the IPEA. This should, in many cases, make it unnecessary to file a demand for international preliminary examination. If the applicant nevertheless wishes to file a demand this must be done before expiry of 3 months after the date of mailing of the ISR/WO-ISA or 22 months after priority date, whichever expires later (Rule 54bis PCT). Amendments under Art. 34 PCT can be filed with the IPEA as before, normally at the same time as filing the demand (Rule 66.1 (b) PCT). If a demand for international preliminary examination is filed and no comments/amendments have been received the WO-ISA will be transformed by the IPEA into an IPRP (International Preliminary Report on Patentability) which would merely reflect the content of the WO-ISA. The demand can still be withdrawn (Art. 37 PCT).
Filing informal comments	After receipt of the ISR/WO-ISA the applicant may file informal comments on the WO-ISA directly with the International Bureau of WIPO. These will be communicated to the designated Offices together with the IPRP (International Preliminary Report on Patentability) at 30 months from the priority date. Please also refer to the next box.
End of the international phase	At the end of the international phase the International Bureau of WIPO will transform the WO-ISA or, if a demand was filed, the written opinion of the IPEA into the IPRP, which will then be transmitted together with possible informal comments to the designated Offices. The IPRP replaces the former IPER (international preliminary examination report).
Relevant PCT Rules and more information	Rule 43 PCT, Rule 43bis PCT, Rule 44 PCT, Rule 44bis PCT, PCT Newsletter 12/2003, OJ 11/2003, OJ 12/2003

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